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the alkali penetrates it less readily than it does the stone ware, and likewise because the heat it receives is sooner transmitted to the matter within.

To collect the metal in proportion as it forms, introduce into the vacant part of the apparatus a rod of iron, well cleaned, and as it must not have time to grow red-hot, take it out again in four or five seconds; it will then be found covered with metal, to remove which the rod is to be plunged instantly into a glass cucurbit filled with essence of turpentine. This cucurbite should be immersed in a tub of water, to prevent the essence from boiling; and notwithstanding this precaution, it will be heated so much sometimes as to take fire on the immersion of the iron rod.

To execute these processes well, three persons are necessary. One should take care of the fire, and work the bellows. The most active should collect the metal as it is produced, and with the utmost celerity plunge the iron rods into the essence. The third must separate the metal that is on the rods, and then plunge them into water, not only to cool them, but also to remove the alkali that may have escaped metallization, or have been formed by combustion previous to the immersion of the metal in the essence of turpentine. He must likewise take care to wipe the rods perfectly dry, that he who collects the metal may have nothing else to do.

These processes, while the metal is producing, requires in the operation a dexterity not inferior to the celerity I have recommended. The attention of him who manages the bellows is also an object of no little importance, for if he suffers the fire to slacken, the metal will immediately cease to be disengaged, and the rods will be covered with nothing but pure alkali. On the contrary, if he encreases the fire at this period of the process, the apparatus will melt, and the experiment fail. This proves how high but uniform the temperature must be. I have observed that the metal is always produced at the heat of melting iron. Accordingly an iron tube will seldom serve twice, and retorts always melt before the whole of the metal is obtained.

I think I may conclude from my experiments, that the production of the metal is not owing, as has been said, to the disoxigenation of the alkali; but that it is a new compound, in which hydrogen appears to have entered into combination, and I conceive in a state of great condensation.

Be this as it may, during the whole of the operation, hydrogen, alkali not converted into metal, and prussic radical in the state of gas, continue to be disengaged. The last in particular I have collected in pretty considerable quantity.

These results tend to prove that hydrogen is one of the component parts of the alkalis, the extrication of which is promoted by the charcoal; or that charcoal itself is a compound, one of the principles of which is hydrogen. There is no alternative but one or the other of these hypotheses.

Observations on the nature of the new properties of Alkaline Metals. By the author of the former paper.

Same Work.

Several of the phenomena that accompany the metallization of potash and soda, appearing to me inexplicable on the hypothesis of the alkalis being simply disoxigenised: and this theory besides agreeing neither with the properties of the oxygen, nor with those of ammonia, the principles of which should be analogous to those of potash and soda, I could not join in opinion with those chemists, who conceive the metallization of potash and soda to be merely the result of the disoxigenation of these substances. On the contrary, without prejudging any thing, I would only consider the facts; with this view I performed the following experiments.

Exp. 1. To prove the presence of carbon in the alkaline metals it was necessary to have recourse to the action of a substance, with which the alkalis have more affinity, than they have with the principles which constitute the metals, and which at the same time should be incapable of furnishing any element that would combine with those I sought to separate from the metalized alkalis.

Silex, from its indestructibility, the state of purity in which it is attainable, and particularly its affinity for the alkalis, appeared to me to unite all th properties that I wished to find in the substance which was to be employed in my experiment.

In fact, having heated silex in a glass tube with a little of the alkaline metal, it combined with the alkali, and set free the carbon.

The carbon thus separated, no longer took fire in the air; it required the assistance of heat.

Exp. 2. Consists in enclosing in a thin bit of lead a ball of the metal of soda, and then immersing it in a vessel filled with lime-water. The metal thus confined is obliged to oxigenate itself at the expense of the oxygen of the water. Two affinities concur, to effect this decomposition: the first is that of the alkali for water, the second that of carbon for oxygen; an affinity so much the more energetic, as in this state the carbon exhibits to us a very remarkable instance of its great propensity to become oxided.

If in this second experiment, I recommend taking the metal of soda, it is on account of its solidity, which allows it to be handled; and because its destruction is more slow, an advantage that allows us to observe the decomposition of the water for some time. If, on the contrary, the experiment were made with the metal of Potash, the decomposition of water would be instantaneous; which on the one hand would oppose the combination of the carbonic acid with the lime water, and on the other, would force the gases resulting from the decomposition of the metal, to break the obstacles opposed to it by the lead, in which they would be included.

We then see that the metal of potash is eminently combustible, and that of soda is less so, a property explicable by the difference of affinity of these alkalis for water.

One remark that I have made, and which will form a very curious experiment, is, that in collecting the metal of potash by means of iron rods, very loud detonations may be produced, the intensity of which is very similar to that of gunpowder employed in ten times the quantity.

The following is the method of repeating this experiment with success: Instead of immersing the iron rods into essence of turpentine, the instant they are removed from the gun-barrel to collect the metal, they must be plunged suddenly and perpendicularly into a bucket of water. An explosion will then take place, the loudness of which will be in proportion to the quantity of metal, and the diameter of the iron rod.

From the foregoing experiments and observations (I am of opinion) it follows:

1st. That the conversion of the alkalis into metals is not a disoxigenation of these substances; and that on the contrary it is a combination of the alkalis, with new elements.

2d. That the affinity of the alkaline metals for oxigen is merely a chemical illusion, occasioned by a substance, the existence of which, in combination with them, was not suspected.

3d. That carbon is one of the constituent principles of the alkaline metals, since it can be obtained separate from them at pleasure, or be converted into carbonic acid by oxigenation.

4. That if the specific gravity of the alkaline metals be less than that of water, it is because hydrogen probably accompanies the carbon in this combination.

5th. That the disoxigenation of substances attempted to be effected by means of the alkaline metals, will always yield equivocal results, until we have a knowledge of all the elements that compose these singular substances.

Observations. To render some of the papers, published by M. Curaudau, on chemical subjects of more use, a marked distinction must be made between the facts he relates, and the inferences he draws from them: whether his mind is framed so different from that of other men, that things seem good proof to him, which would only form the basis of conjecture to others, whether he is over hasty, or only wishes to excite attention by combating the opinions of the best chemists, and defending theories in direct opposition to them, is not easily determined, nor perhaps very material; but it is, however, proper to state, that the principal circumstances in which he differs from them, namely, that the alkalis contain oxygen, and that the alkaline metals attract it with avidity, have been proved in the most satisfactory manner in the affirmative by Mr. Davy, in his last public lectures, by experiments which perhaps M. Curaudau never heard of. The experiments of Mr. Curaudau are however valuable, for proving that carbon exists in combination with the alkaline metals, and shewing that it is very probable hydrogen is also combined with them;" but they by no means show that these metals do not attract oxygen, but only that they do not attract *the whole* of the oxygen taken up, but that a part of it is consumed by the combined carbon.

His fourth inference is also destitute of any real support, for he has stated no arguments to show that hydrogen combined in the solid state, has the property of diminishing the specific gravity of any substance whatsoever.

The circumstance of carbon being combined with the alkaline metals, or perhaps being necessary to their metalization, adds weight to certain conjectures of Mr. Davy's, mentioned at his lectures, which tend to revive the doctrine of Stahll, with some modification, and to make it probable that some undetermined substance, either of an inflammable nature, or some form of fire itself, exists in combination with every metal; but some of Mr. Davy's experiments proved, that this was not hydrogen, in the case of metal of potash

The conjecture of M. Curaudau, that all iron contains carbon, is by no means confined to him, but is in fact the opinion of many experienced chemists.

Mr. Davy's theory, relative to the effect of iron in metallizing potash, is, that some of the iron first decomposes water contained in the potash, by absorbing its oxygen; that the hydrogen thus formed combines with the potash, and accelerates its fusion, and that in this state it parts with its oxygen, probably to the unoxided part of the iron.

Much is still wanted to complete our knowledge of the metals. If Mr. Curaudau's opinion of the agency of carbon in metallization of potash is confirmed, the discovery will do him much honour, as materially increasing this knowledge.

DETACHED ANECDOTES.

THE LAUDABLE PERSEVERANCE OF A FEW, IS OFTEN CROWNED WITH SUCCESS.—ORIGIN OF THE ATHENÆUM IN LIVERPOOL.

LIVERPOOL IS CHARACTERIZED BY ONE OF HER NATIVE POETS, AS,

> ....intent,
> "On life's prime object, cent per cent,
> Heeds not a soft delicious strain;
> Nor any notes, save notes of gain."

And yet a stranger who views her Athenæum, Lyceum, and Union, and perceives so much of superfluous wealth applied to literary purposes, might be disposed to think highly of the literary taste of the inhabitants of this commercial and opulent town; but, on a closer view, perhaps, it may be found that these grand erections had at first their rise in the exertions of a few, and afterwards in their success encouraging similar undertakings, because, the stock in the Athenæum became a gainful commercial speculation. These spacious reading-rooms were built by subscription, and are the property of the subscribers; they are plentifully supplied with news papers, magazines, reviews, &c. to which is added in the Athenæum, a large well chosen library; with the Lyceum, the Liverpool library, an old institution has been since connected. To the exertions of two public spirited individuals is owing the successful attempt to build the Athenæum, the precursor of the others. A meeting was publicly advertised to consider of a proposal to establish a news-room and library, on an nlarged and liberal plan. A

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